EFFECTS OF INTERIM FLOWS FROM GLEN CANYON DAM ON AQUATIC RESOURCES OF THE LOWER COLORADO RIVER FROM NATIONAL CANYON TO LAKE MEAD

Trip No. 95-02: June 13-July 1, 1995

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I. INTRODUCTION:

This report summarizes activities and preliminary results of Trip No. 95-02 led by the Hualapai Department of Natural Resources. Personnel, types of data collected, general observations, recommendations for future trips and summaries of fish species captured are presented here to provide timely information for other research and management activities.

II. LOGISTICS, RESEARCH SCHEDULE AND PERSONNEL

Trip No. 95-02 launched from Lee's Ferry on June 11, 1995 and continued to Havasu Creek where the Hualapai Aquatic Team was deployed on June 13, 1995. The study began at National Canyon (RM 164.4) and continued to Pearce Ferry (RM 280).
Reach 3 of the study area included National Canyon (RM 165.4) to Diamond Creek and Reach 4 from Diamond Creek (RM 226.0) to Pearce Ferry. Trip No. 95-02 concluded on July 1, 1995, taking out at Pearce Ferry (See Table 1 for participating personnel).

III. DATA COLLECTED:

We collected data during Trip No. 95-02 regarding aquatic resources found within the confines of the Hualapai Indian Reservation. Below we present these preliminary data.

A. Native Fish Captured:

Within Reach 3 a total of 142 flannelmouth suckers (FM) were captured consisting of 33 Young of Year (YOY), 82 juveniles (juv), and 27 adults. Reach 4 produced 17 flannelmouths consisting of 10 YOY, 3 juv, and 4 adults. Within reaches 3 and 4, 26 flannelmouths were implanted with PIT-Tags including three recaptures, (See Tables 4 and 5).

A total of 5 bluehead suckers (BH) were captured within reach 3 consisting of 1 YOY and 4 juveniles. Reach 4 produced 2 juveniles.

297 speckled dace (SD) were captured in reach 3; 5 YOY, 3 juv, and 289 adults. Reach 4 produced a total of 1 YOY, 8 juv, and 207 adults.

One humpback chub was captured at RM 181.2. This chub weighed 202 grams and was 275 mm TL. It was not PIT tagged. Unfortunately, this fish was found dead in the net. The chub was found entangled along with debris associated with higher flows. This debris may have contributed to its death. This

specimen is being transferred to Arizona Game and Fish Department in Phoenix.

**** Note See Tables 3 and 4 for totals.**

B. Water Quality:

Water quality data was collected at 14 sites throughout the study reaches 3 and 4. We sampled temperature, conductivity, dissolved oxygen, and pH. Ten of these sites were sampled within the mainstem. A low of 12.82 degrees celsius at RM 208.9 and a high of 16.84 degrees celsius at RM 273.5 were observed. The remaining four sites were located in tributaries (Spencer, Travertine Falls, Bridge and Quatermaster) with Spencer Creek having both the high of 28.22 and low of 19.57 degrees celsius. Refer to Table 6 for details.

C. Primary/Secondary Productivity:

Five drift sites were sampled throughout the trip measuring the rising, falling, steady low and high hydrographs: RM 183.1, RM 208.9, RM 229.6, RM 245.8, and RM 273.5. Analysis and quantification of these samples will be presented in the final report.

Two (2) Hess samples were collected within reach 4.

Surber samples were collected in Spencer Creek located approximately 0.5 mile from the mainstem.

D. River Stage Monitoring:

Eight mainstem sites were monitored for river stage levels. Three of these sites were located in reach 3 and five sites within reach 4. Monitoring sites were as follows: RM 171.0, RM 183.1, Granite Park RM 208.9, Travertine Falls RM 230.4, RM 242.7, Spencer Creek RM 245.9, RM 259.8 Quartermaster, and Boundary Canyon RM 273.3. The maximum stage change for the entire trip was 37 cm within a 14 hour period at RM 208.9, Granite Park, June 18, 1995.

E. Mapping of GIS Sites:

All fish and drift net sampling efforts were placed upon mylar overlays using aerial photographs for GIS sites 10, 11, 12, and 13. This information will be transferred to the Hualapai GIS coordinator who will enter these data into the GCES Database.

F. Diet analysis of striped bass and channel catfish:

Stomachs of striped bass (SB) and channel catfish (CC) were taken for analysis from every other fish captured. For the remaining specimens, FLOY-Tags were implanted. A total of 77 tags were implanted for both reach 3 and 4; 69 tags for channel catfish, 4 for striped bass and an additional 4 for largemouth bass, (Refer to Table 4 and 5).

Gape measurements were taken for all game fish mentioned above including rainbow trout.

G. Habitat and Specimen Photographs:

Five (5) rolls, 36 exposure, of slide film were taken throughout the trip of habitat and aquatic specimens. These slides will be labeled and housed at the Hualapai Department of Natural Resources.

IV. OBSERVATIONS:

* Flows from Glen Canyon Dam were approximately 15,000 - 18,000 cfs. Fluctuations varied only about 37 centimeters during the trip.

* Riparian vegetation was inundated in most areas sampled. In some cases cattail marshes were thoroughly wetted extending many meters away from the main channel. Some of these were available for fish sampling while others were too choked with vegetation.

* Many YOY and juvenile fishes were found utilizing these submerged vegetation habitats. Flannelmouth suckers, speckled dace and fathead minnows predominated in these habitats. YOY of all these species were captured within these newly formed habitats. These areas had increased temperatures over the mainstem river.

* Mainstem river temperatures were not as great as during other sampling trips during this time of year. This was likely attributable to unusual weather conditions experienced during this trip. Severe rainstorms were experienced often with overcast conditions that limited solar warming of the main channel.

* Catch rates for adult flannelmouth and bluehead suckers were down from previous sample efforts.

* Striped bass were captured upstream as far as RM 180.

* Sampling in the side-channel at RM 209 produced many adult carp and some channel catfish and striped bass. Seining in

channel margins and isolated pools found mostly fathead minnows. Water temperatures were much warmer than the mainstem, 18.0 compared to 14.0 degrees celsius, even though some flow-through from the main channel was entering this side-channel.

* Numerous channel catfish were captured between Separation and Spencer.

* Several largemouth bass were observed in Surprise Creek.

* >30 channel catfish were captured within ore pool of Spencer Creek

* A spiny softshell turtle (*Trionyx spiniferus*) captured near Quartermaster, measuring 89 mm in diameter.

* High flows prevented seining efforts on several of the usual sample areas.

* Trammel nets did not require cleaning throughout the entire trip as compared with Trip # 95-01, April.

V. RECOMMENDATIONS:

* Continue to monitor the side channel at RM 209 for species composition and water chemistry.

* Focus efforts during the September trip to evaluate the effects of steady flow conditions from Glen Canyon Dam on fish and food resources.

Table 1. Participating Personnel for Trip No. 95-02, Hualapai Aquatic Studies			
June 13-July 1, 1995			
Personnel	**Affliation**	**Dates**	**Comments**
Bill Leibfried	SWCA, Inc.	June 13 - 20, 1995	Principle Investigator
Ben Zimmerman	Hualapai	June 20 - July 1, 1995	Project Leader
Michael Vaughn	Hualapai	June 13 - July 1, 1995	Biologist, Reach 3 and 4
Richard Beecher	Hualapai	June 13 - July 1, 1995	Biologist, Reach 3 and 4
Scott Crozier	Hualapai	June 13 - 20, 1995	Biologist, Reach 3
Connie Graham	SWCA, Inc.	June 13 - June 22, 1995	Biologist, Reach 3 and 4
		June 26 - July 1, 1995	
Mimi Murov	SWCA, Inc.	June 22 - 26, 1995	Biolcgist, Reach 4
Duffy McCabe	OARS	June 13 - 20, 1995	Boatmen\Cook, Reach 3
	SWCA, Inc.	June 20 - July 1, 1995	Electrofishing Boatmen
Lars Niemi	SWCA, Inc.	June 13 - 20, 1995	Electrofishing Boatmen
	OARS	June 20 - July 1, 1995	Boatmen\Cook, Reach 4
Phil Beck	OARS	June 13 - 20, 1995	Boatmen\Cook, Reach 3
Melissa Richmond	Hualapai	June 20 - July 1, 1995	Cook, Reach 4

Table 2. Summary of Fish Captured with Reach 3, Trip NO. 95-02. June 13-June 20, 1995						
		MINNOW TRAPS	NETTING	SEINING	ELECTRO-BOAT	TOTALS
COMMON	YOY			6		6
CARP	JUV		1			1
	ADULT		13		18	31
CHANNEL	YOY					0
CATFISH	JUV					0
	ADULT		2	1		3
STRIPED	YOY					0
BASS	JUV					0
	ADULT		5			5
SPECKLED	YOY			5		5
DACE	JUV			3		3
	ADULT	127		131	31	289
RED SHINER	YOY					0
	JUV					0
	ADULT					0
FATHEAD	YOY			84		84
MINNOW	JUV			9		9
	ADULT	12		39	5	56
FLANNEL-	YOY			30	3	33
MOUTH	JUV	9		68	5	82
	ADULT		22		5	27
RAINBOW	YOY					0
TROUT	JUV				1	1
	ADULT		2	1		3
BLUEHEAD	YOY	1				1
	JUV			3	1	4
	ADULT					0
HUMPBACK	YOY					0
CHUB	JUV					0
	ADULT		1			1
TOTALS		149	46	380	69	644

Table 3. Summary of Fish Captured in Reach 4, Trip NO. 95-02, June 20-July 1, 1995								
		MINNOW TRAPS	LIGHT TRAPPING	NETTING	SEINING	ELECTRO-BOAT	ELECTRO-BACKPACK	TOTALS
COMMON	YOY	1						1
CARP	JUV						3	3
	ADULT			27		5	35	67
CHANNEL	YOY							0
CATFISH	JUV							0
	ADULT			62		5	31	98
STRIPED	YOY							0
BASS	JUV					3		3
	ADULT			2		6		8
SPECKLED	YOY						1	1
DACE	JUV	1				7		8
	ADULT	36			12		159	207
RED SHINER	YOY	81	9		117	18	10	235
	JUV				43			43
	ADULT	113	1		305	27	48	494
FATHEAD	YOY			1				1
MINNOW	JUV							0
	ADULT				2			2
FLANNEL-	YOY	9				1		10
MOUTH	JUV	3						3
	ADULT			3	1			4
RAINBOW	YOY							0
TROUT	JUV							0
	ADULT			1				1
BLUEHEAD	YOY							0
	JUV	2						2
	ADULT							0
PLAINS KILLI-	YOY				1			1
FISH	JUV				3			3
	ADULT	5						5
GREEN	YOY							0
SUNFISH	JUV							0
	ADULT						3	3
THREADFIN	YOY	1	6					7
SHAD	JUV							0
	ADULT			1				1
BLUEGILL	YOY							0
	JUV							0
	ADULT					1		1
LARGEMOUTH	YOY						2	2
BASS	JUV				1		1	2
	ADULT			2		1		3
BLACK	YOY	1						1
CRAPPIE	JUV							0
	ADULT			1				1
TOTALS		253	16	100	485	74	293	1221

TABLE 4. SUMMARY OF PIT AND FLOY TAGS FOR TRIP NO. 95-02, HUALAPAI AQUATIC STUDIES, REACH 3								
June 13-July 1, 1995								
SPECIES	DATE	TAG #	RECAPTURE	TL (mm)	SL (mm)	WT (g)	RM (CAPTURED)	SEX
FM	14-Jun-95	7F7A0F146F	N	272	224	198	168.9	M
FM	14-Jun-95	1F7B534350	N	285	234	258	169.8	M
FM	14-Jun-95	1F7A3B317B	N	300	256	277	169.8	M
FM	15-Jun-95	7F7B073964	Y	329	280	323	180.6	M
FM	15-Jun-95	1F78303E7B	N	386	330	561	181.2	U
FM	15-Jun-95	1F78216563	N	392	335	662	180.6	F
FM	15-Jun-95	1F7777591A	N	394	345	606	180.9	M
FM	16-Jun-95	1F7B10272F	N	283	239	205	181.4	M
FM	16-Jun-95	1F7A711A5L	N	500	430	1523	182.2	F
CC	17-Jun-95	02573FLAGY	N	287	235	254	208.9	U
FM	17-Jun-95	1F7A321520	N	245	205	140	208.4	M
FM	17-Jun-95	1F7A357042	Y	251	215	150	208.4	M
FM	17-Jun-95	1F7A36327F	N	277	235	210	208.4	M
FM	17-Jun-95	1F7A334F65	N	281	244	200	208.4	M
FM	17-Jun-95	1F78166D66	N	346	293	352	208.4	M
FM	17-Jun-95	1F7825556F	N	363	308	445	208.4	F
FM	17-Jun-95	1F7A7E4128	Y	371	310	500	208.4	M
FM	17-Jun-95	1F78287948	N	375	320	433	208.4	M
FM	17-Jun-95	1F7A3B2A02	N	511	440	1363	208.4	F
SB	17-Jun-95	02574FLAGY	N	611	495	2255	180.8	U
CC	18-Jun-95	02565FLAGY	N	277	217	255	208.2	M
CC	18-Jun-95	02508FLAGY	N	313	245	284	207.4	U
FM	18-Jun-95	1F78253113	N	428	355	690	208.0	F
SB	18-Jun-95	02564FLAGY	N	512	425	1134	207.4	U
FM	19-Jun-95	1F7773787F	N	240	205	123	209.3	M
FM	19-Jun-95	1F78232B1B	N	245	203	148	207.3	M
FM	19-Jun-95	1F7A2A5766	N	386	283	390	207.3	F
FM	19-Jun-95	1F780C5A03	N	402	339	593	207.4	M
SB	19-Jun-95	02563FLAGY	N	411	335	567	209.3	U

TABLE 5. SUMMARY OF PIT AND FLOY TAGS FOR TRIP NO. 95-02, HUALAPAI AQUATIC STUDIES, REACH 4								
SPECIES	DATE	TAG #	RECAPTURE	TL (mm)	SL (mm)	WT (g)	RM (CAPTURED)	SEX
CC	21-Jun-95	02277FLAGY	N	290	240	227	230.3	U
CC	21-Jun-95	02552FLAGY	N	319	248	227	230.3	U
SB	21-Jun-95	02554FLAGY	N	349	282	284	230.3	U
CC	22-Jun-95	02285FLAGY	N	222	173	170	242.0	U
CC	22-Jun-95	02285FLAGY	N	225	175	113	242.0	U
CC	22-Jun-95	02281FLAGY	N	226	181	142	240.1	U
CC	22-Jun-95	02288FLAGY	N	240	190	113	242.0	U
CC	22-Jun-95	02279FLAGY	N	244	193	170	240.1	U
CC	22-Jun-95	02282FLAGY	N	255	200	113	240.2	U
CC	22-Jun-95	02278FLAGY	N	257	200	170	239.6	U
CC	22-Jun-95	02292FLAGY	N	258	200	170	242.0	U
CC	22-Jun-95	02290FLAGY	N	265	206	113	239.6	U
CC	22-Jun-95	02291FLAGY	N	267	213	142	240.1	U
CC	22-Jun-95	02289FLAGY	N	352	283	284	239.5	U
FM	22-Jun-95	1F7A2B0E2E	N	394	327	580	240.2	U
LG	22-Jun-95	02891FLAGY	N	228	182		236.5	U
CC	23-Jun-95	02297FLAGY	N	214	171	142	241.0	U
CC	23-Jun-95	02299FLAGY	N	244	194	113	243.1	U
CC	23-Jun-95	02232FLAGY	N	256	204	170	243.1	U
CC	23-Jun-95	02298FLAGY	N	265	209	142	141.9	U
CC	23-Jun-95	02557FLAGY	N	268	213	227	247.5	U
CC	23-Jun-95	02164FLAGY	N	272	215	227	247.5	U
CC	23-Jun-95	02570FLAGY	N	273	212	170	245.3	U
CC	23-Jun-95	02560FLAGY	N	284	223	198	245.3	U
CC	23-Jun-95	02294FLAGY	N	290	229	227	247.5	U
CC	23-Jun-95	02235FLAGY	N	291	221	170	245.3	U
CC	23-Jun-95	02293FLAGY	N	295	230	227	241.8	U
CC	23-Jun-95	02238FLAGY	N	299	240	227	245.3	U
CC	23-Jun-95	02300FLAGY	N	300	235	227	141.9	U
CC	23-Jun-95	02287FLAGY	N	333	260	340	247.5	U
CC	23-Jun-95	02556FLAGY	N	340	271	312	245.3	U
CC	23-Jun-95	02236FLAGY	N	348	283	340	246.3	U
CC	23-Jun-95	02237FLAGY	N	389	320	510	246.3	U
CC	25-Jun-95	02805FLAGY	N	258	210	155	SPENCER CREEK	U
CC	25-Jun-95	02809FLAGY	N	266	208	159	SPENCER CREEK	U
CC	25-Jun-95	02815FLAGY	N	271	234	227	SPENCER CREEK	U
CC	25-Jun-95	02810FLAGY	N	278	223	183	SPENCER CREEK	U
CC	25-Jun-95	02821FLAGY	N	282	222	170	SPENCER CREEK	U
CC	25-Jun-95	02808FLAGY	N	287	232	246	SPENCER CREEK	U
CC	25-Jun-95	02811FLAGY	N	289	233	241	SPENCER CREEK	U
CC	25-Jun-95	02806FLAGY	N	302	245	251	SPENCER CREEK	U
CC	25-Jun-95	02803FLAGY	N	308	248	288	SPENCER CREEK	U
CC	25-Jun-95	02814FLAGY	N	308	242	284	SPENCER CREEK	U
CC	25-Jun-95	02813FLAGY	N	318	256	305	SPENCER CREEK	U
CC	25-Jun-95	02812FLAGY	N	322	258	320	SPENCER CREEK	U
CC	25-Jun-95	02819FLAGY	N	327	265	354	SPENCER CREEK	U
CC	25-Jun-95	02804FLAGY	N	332	287	308	SPENCER CREEK	U
CC	25-Jun-95	02807FLAGY	N	349	282	362	SPENCER CREEK	U
CC	25-Jun-95	02820FLAGY	N	359	292	515	SPENCER CREEK	U
CC	25-Jun-95	02801FLAGY	N	367	310	609	SPENCER CREEK	U
CC	25-Jun-95	02802FLAGY	N	370	304	595	SPENCER CREEK	U
CC	25-Jun-95	02818FLAGY	N	387	304	490	SPENCER CREEK	U

TABLE 5 CONT.								
SPECIES	DATE	TAG #	RECAPTURE	TL (mm)	SL (mm)	WT (g)	RM (CAPTURED)	SEX
CC	25-Jun-95	02822FLAGY	N	290	230	224	SPENCER CREEK	U
CC	26-Jun-95	02824FLAGY	N	278	215	161	SPENCER CREEK	U
CC	26-Jun-95	02823FLAGY	Y	351	285	413	SPENCER CREEK	U
CC	26-Jun-95	02825FLAGY	N	382	312	514	SPENCER CREEK	U
CC	26-Jun-95	02252FLAGY	N	320	254	280	SPENCER CREEK	U
LG	26-Jun-95	02253FLAGY	N	267	210	244	SPENCER CREEK	U
LG	26-Jun-95	02255FLAGY	N	281	230	359	SPENCER CREEK	U
CC	26-Jun-95	02275FLAGY	N	290	230		SPENCER CREEK	U
CC	25-Jun-95	02823FLAGY	N	352	282	435	SPENCER CREEK	U
CC	26-Jun-95	02254FLAGY	N	293	227	230	SPENCER CREEK	U
CC	26-Jun-95	02271FLAGY	N	275	210	142	252.7	U
CC	26-Jun-95	02269FLAGY	N	352	273	397	253.2	U
FM	26-Jun-95	1F7B3C3D4D	N	404	337	676	253.0	U
CC	27-Jun-95	02265FLAGY	N	274	215	113	259.9	U
CC	27-Jun-95	02268FLAGY	N	268	211	113	260.0	U
CC	27-Jun-95	02267FLAGY	N	262	209	113	260.0	U
CC	27-Jun-95	02266FLAGY	N	331	260	255	259.6	U
FM	27-Jun-95	1F777C4E20	N	324	266	369	259.8	F
CC	28-Jun-95	02264FLAGY	N	271	210	113	274.2	U
CC	29-Jun-95	02262FLAGY	N	350	285	482	274.8	U
FM	29-Jun-95	1F7A76343D	N	440	370	748	274.3	U
CC	30-Jun-95	02261FLAGY	N	360	285	369	280.0	U
LG	30-Jun-95	02259FLAGY	N	342	275	162	280.0	U

Table 6. Water Quality Data Collected From Trip No. 95-02, Hualapai Aquatic Studies. Hualapai Indian Reservation, Colorado River, June 13 - July 1, 1995.

		RM 171.0	RM 183.1	RM 208.9	RM 224.5	RM 230.4	RM 242.7	RM 245.9	RM 252.9	RM 259.5	RM 273.6
Dates:		Jun. 15	Jun. 15-17	Jun. 17-19	Jun. 19-20	Jun. 20-22	Jun 22-23	Jun 24-26	Jun. 26-27	Jun. 27-28	Jun. 28-30
TEMP. C	High	14.54	14.54	13.92	14.25	15.08	15.46	16.42	16.30	16.28	16.84
	Low	13.95	13.01	12.82	14.00	14.43	15.16	15.55	15.52	15.49	15.91
	Average	14.27	13.81	13.43	14.16	14.72	15.25	15.86	15.81	15.84	16.38
COND.	High	0.88	0.89	0.89	0.88	0.91	0.91	0.90	0.90	0.89	0.88
	Low	0.88	0.88	0.88	0.87	0.87	0.89	0.75	0.89	0.86	0.86
	Average	0.88	0.88	0.88	0.88	0.88	0.90	0.88	0.89	0.88	0.87
DO	High	10.70	10.84	10.86	10.76	10.77	10.67	10.48	10.48	10.41	10.36
	Low	10.36	10.42	10.56	10.61	10.40	10.64	10.32	10.41	10.26	10.16
	Average	10.60	10.65	10.74	10.68	10.60	10.65	10.43	10.44	10.35	10.25
pH	High	8.20	8.22	8.25	8.24	8.25	8.25	8.30	8.31	8.28	8.27
	Low	7.82	7.90	8.11	8.02	8.19	8.05	8.20	8.25	8.23	8.19
	Average	8.00	8.15	8.22	8.19	8.23	8.20	8.27	8.29	8.26	8.25
		SPENCER CREEK	TRAV. FALLS CREEK	BRIDGE CYN. CREEK	QUARTERMASTER CREEK						
Dates:		Jun. 23-24	Jun. 22	Jun. 22	Jun. 28						
TEMP. C	High	28.22	21.10	25.48	22.13						
	Low	19.57	21.10	25.48	22.13						
	Average	22.33	21.10	25.48	22.13						
COND.	High	0.66	1.66	0.57	0.78						
	Low	0.55	1.66	0.57	0.78						
	Average	0.62	1.66	0.57	0.78						
DO	High	10.41	9.02	8.83	8.59						
	Low	7.70	9.02	8.83	8.59						
	Average	8.64	9.02	8.83	8.59						
pH	High	8.53	8.31	8.00	7.98						
	Low	8.21	8.31	8.00	7.98						
	Average	8.35	8.31	8.00	7.98						